Joint Workshop of The United States Geological Survey & The California Exotic Pest Plant Council

Presentation Abstracts

Session I

Introduction and Overview of Invasive Species in the Southwest

Matt Brooks
USGS, Western Ecological Research Center,
Las Vegas Field Station, 6770 S. Paradise Rd.,
Las Vegas, NV 89119; 702 914-2206 x225,
matt_brooks@usgs.gov

Deserts are among the least invaded ecosystems worldwide. However, the relatively few species that have successfully invaded deserts have had dramatic ecological effects. Saltcedar (*Tamarix* spp.) guzzles precious water and changes fire regimes in riparian systems, and annual and perennial grasses compete with native plants for soil nutrients and change fire regimes in both riparian and upland systems. As deserts become urbanized, dispersal rates of invasive plant propagules will increase and environmental conditions may become more suitable for the establishment of new invasives as irrigation runoff and atmospheric pollution increase levels of soil water and nitrogen.

Some native species can be considered invasive in some cases, and critical components of native diversity in other cases within the same desert bioregion. For example, creosote bush (*Larrea tridentata*) and honey mesquite (*Prosopis glandulosa*) are considered invasive along the ecotone between native grasslands and shrublands in the eastern Sonoran Desert and northern Chihuahuan Desert, and important keystone species in shrub communities of adjacent hot desert regions. Sagebrush (*Artemisia* spp.) is considered to be invasive in the rangelands of Arizona and New Mexico, yet it is a high priority for conservation in the Great Basin, where it is threatened by two other native species, Juniper (*Juniperus* spp.) and pinyon pine (*Pinus edulis*), invading from adjacent woodlands. Disagreement on management strategies for these species complicates integration among regional weed management programs.

Most past research on invasive plants has been conducted by biologists, who have rarely collaborated with physical scientists. To be most effective, future research will need to be multidisciplinary, especially in arid regions where physical and chemical soil properties and climate appear to have such strong effects on habitat invasibility. This session on multidisciplinary invasive plant research will present examples of potentially beneficial collaborations between scientists who are studying invasive species and scientists studying physical processes that potentially control plant invasions.

Role of Environmental Heterogeneity and Climate Variability in Plant Invasions: Insights from the Fossil Record

Julio L. Betancourt
USGS-Desert Laboratory, 1675 W. Anklam Rd.,
Tucson, AZ 85745,
jlbetanc@usgs.gov, 520 670 6821
Stephen T. Jackson, Mark E. Lyford, Jodi Norris, and Stephen T. Gray, Dept. of Botany, Univ. of Wyoming, Laramie, WY 82071

Natural migrations provide model systems for understanding biotic responses to global change and invasions of non-native species. Here, we draw from the fossil record of plant migration of western North America to highlight the influence of environmental heterogeneity in dictating patterns of establishment and spread, and of climatic variability in pacing migration. We have purposefully selected ongoing natural migrations that are now being modulated by contemporary land use. Current theory of biotic invasions emphasizes population processes of dispersal, establishment, and expansion, where environmental heterogeneity is typically treated as a binary classification of favorable and unfavorable sites, and climatic variation as stochastic variation about a mean. Favorable sites, however, may range from places that can be occupied only with continual immigration to those where populations can per-